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ABSTRACT

A proposal is provided for Triton College's team-taught course combining freshman composition and engineering. After introductory material notes that the course has been taught for 6 years at Triton by a variety of English and engineering instructors, a rationale for the course stresses the need to promote understanding of the roles of engineer and information processor, the low level of young engineer's writing ability, and the fragmentation of English courses in many colleges. Next, the organization of the 16- to 18-week course is discussed and basic course activities are identified; i.e., writing a proposal, abstracts, and memoranda; interviewing an engineer; describing objects, mechanisms, and processes; preparing formal and oral reports; using graphics; doing case studies and readings; using the library; and employing problem-solving strategies. This section also outlines the concurrence of activities, the time sequence, assignments, grading, and in- and out-of-class activities. Selected features of course content are then discussed, including the steps involved in writing assignments: identifying the subject; generating information; developing a controlling idea; analyzing, categorizing, and sequencing information; analyzing the audience; using the appropriate format; and proofreading. In addition, the paper discusses pre- and post-testing, oral communication, ethics, and vocabulary development. The tentative syllabus is appended. (HB)

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ED221232

A TEAM-TAUGHT COURSE COMBINING FRESHMAN COMPOSITION AND INTRODUCTION TO ENGINEERING

By: Dr. L. V. Brillhart and M. B. Debs

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JC 820 298

Triton College, River Grove, Illinois, offers a unique engineering-rhetoric course that meets the interdisciplinary demands of contemporary education while at the same time it encourages faculty development.

Designed under the auspices of the National Science Foundation and CAUSE by Ms. M. B. Debs and Dr. L. V. Brillhart, the course introduces students to the engineering profession as well as to the communication techniques required in that profession. The team-taught course, utilizing an English and an engineering instructor, requires neither additional personnel nor exceptional expertise on the part of participating faculty. It has been taught for six years by a variety of engineering and English faculty.

July 1982

COURSE PROPOSAL -

A TEAM-TAUGHT COURSE COMBINING FRESHMAN COMPOSITION AND INTRODUCTION TO ENGINEERING

The proposed freshman course would combine two courses typically offered in the first year of the engineering curriculum: freshman composition and an introduction to engineering. Ideally, such a combination should be team-taught by an engineering instructor and an English instructor. It is possible, however, to work out the logistics so that both instructors need not bepresent at all class meetings. Although primarily designed for students considering engineering as a career choice, course content can be easily adapted to accommodate students interested in engineering technology, physical sciences, business, and related fields. In essence, this freshman course offers the opportunity to bridge the gap between the "two cultures," and, in so doing, to understand the role of the engineer as an information processor.

NEED FOR THE COURSE

During the past decade, industry has been increasingly critical of young engineers' writing abilities. In response to this criticism, engineering colleges have been instituting technical writing courses, primarily at the junior/senior level. Nonetheless, a national survey of deans of engineering colleges indicates that the typical engineering student is offered an average of 4.5 hours of writing instruction and, as part of

this, is required to take only one semester of freshman composition. (One dean commented that writing does not have to be taught in a composition course.) Our own experience strongly suggests that a communication course which provides some introduction to technical writing as well as a sound base in rhetorical principles proves extremely beneficial to the student when offered in the freshman year, since it then encourages students to practice acquired skills in subsequent engineering courses which require lab reports and other writing. In this way, students are able to develop and reinforce good communication skills before entering the job market, especially with the aid of an additional course in technical communication at the upper level. We need to realize that in this job market, according to a study by the Air Force Institute of Technology (Davis, 1975), the average engineer will spend 24% of his time writing and an additional 31% working with material written by others. W. Moody of IBM suggests that this may be five times the amount of time an engineer spends in "doing engineering" for which he was trained.

Additionally, a technically-oriented in troductory rhetoric course responds directly to the needs of the student. A student's motivation - his or her "felt need" for new knowledge or increased skills - is a critical factor in any learning. Students, especially freshmen, in the technologies and sciences look upon writing "as a superfluous, bothersome and usually irrelevant aspect of their technical work" (Miller, 1979). Their learning styles are, in part, antithetical to

pedagogic strategies used in many composition courses. Unfortunately, these same students often have only a vague understanding of other skills demanded by the engineering profession. These skills, such as problem identification and solution, design, and investigation, are directly parallel to steps in the composing process. As students learn to use rhetorical conventions, they discover that writing serves as an integral and constructive component of any problem-solving situation. Further, they discover aspects and issues in engineering which usually are not presented until the junior or senior years, if at all.

Finally, we note that the English curriculum in many schools is becoming increasingly fragmented - with technical writing offered for some students, persuasive writing for others, and expressive writing for a few. Most students, however, respond to the challenge of finding connections and can be successfully directed in synthesizing apparently conflicting information. In a team-taught course, two instructors can simultaneously offer very different (or similar) perspectives. In a writing course that is also an introduction to engineering, students can learn the logic of writing as a useful human endeavor, as well as the communication function of the engineer in contemporary society.

COURSE ORGANIZATION

This proposal assumes a 16 to 18 week semester, with the class meeting four hours per week. Certain assignments may be eliminated to compensate for shorter terms. The following activities are basic to the course:

Proposal
Abstracts
Interview of engineer
Memos
Business correspondence
Description of an object
Description of a mechanism
Description of a process
Instructions
Formal report
Oral report
Use of graphics
Case studies: ethics
Readings
Use of the library
Problem-solving strategies

As part of most of these activities, the students will also consider writing as a problem in design. They will be required to understand and apply the principles of sentence structure, paragraph development, audience analysis, rhetorical modes, transition devices, style, tone, word choice, and proofreading. Selected conventions of technical writing will be introduced. Several exercises which will aid a student's transition to a second rhetoric course or to other humanities courses will be incorporated throughout the semester.

Students do well when a number of activities occur concurrently. Figure 1 illustrates the time sequence of the course activities. (See Figure 1 on next page.)

Rather than being linearly developed, the course organization is branched, as illustrated in Figure 2. (See Figure 2 on following page.)

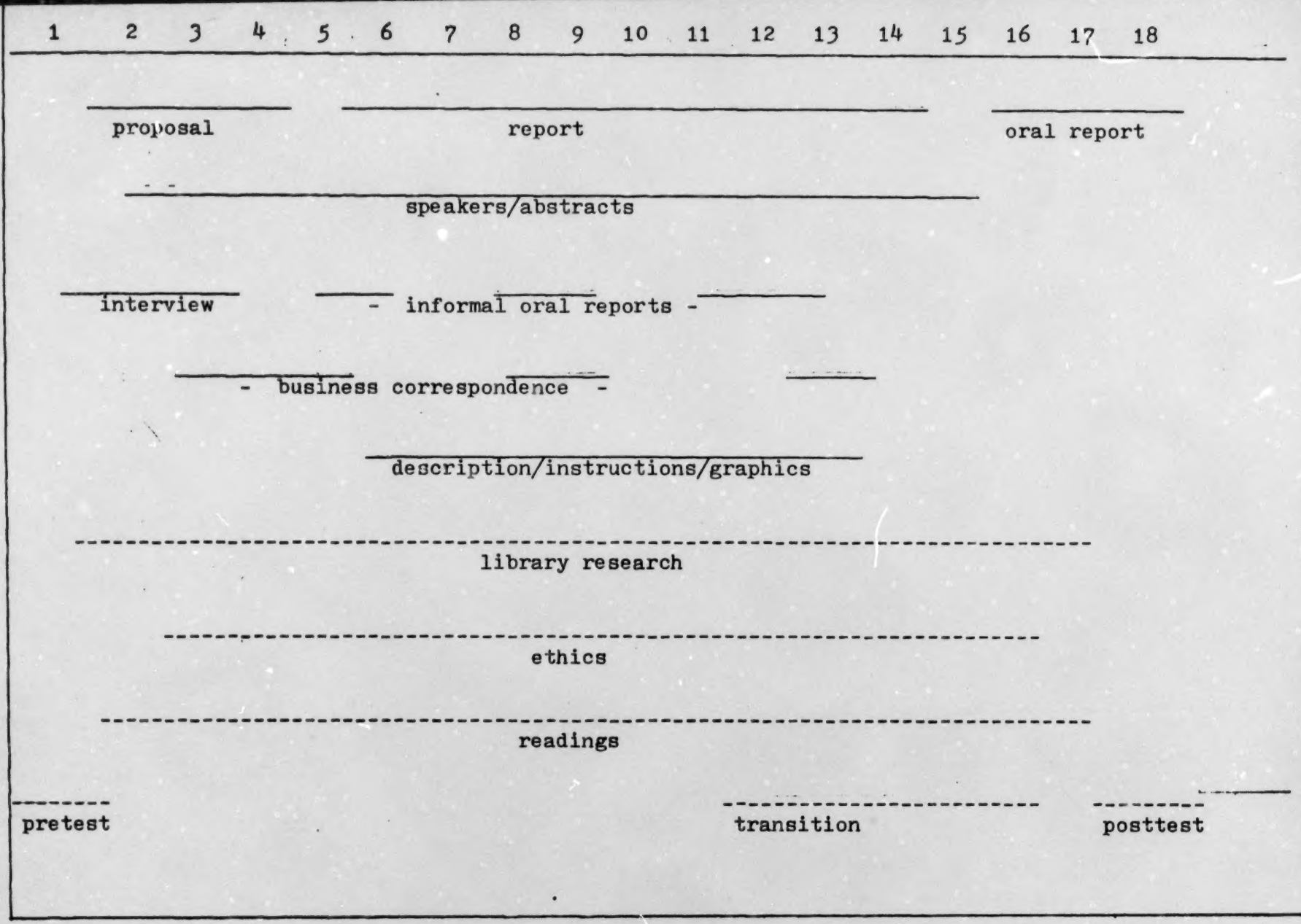

Figure 1: Time Line of Class Activities

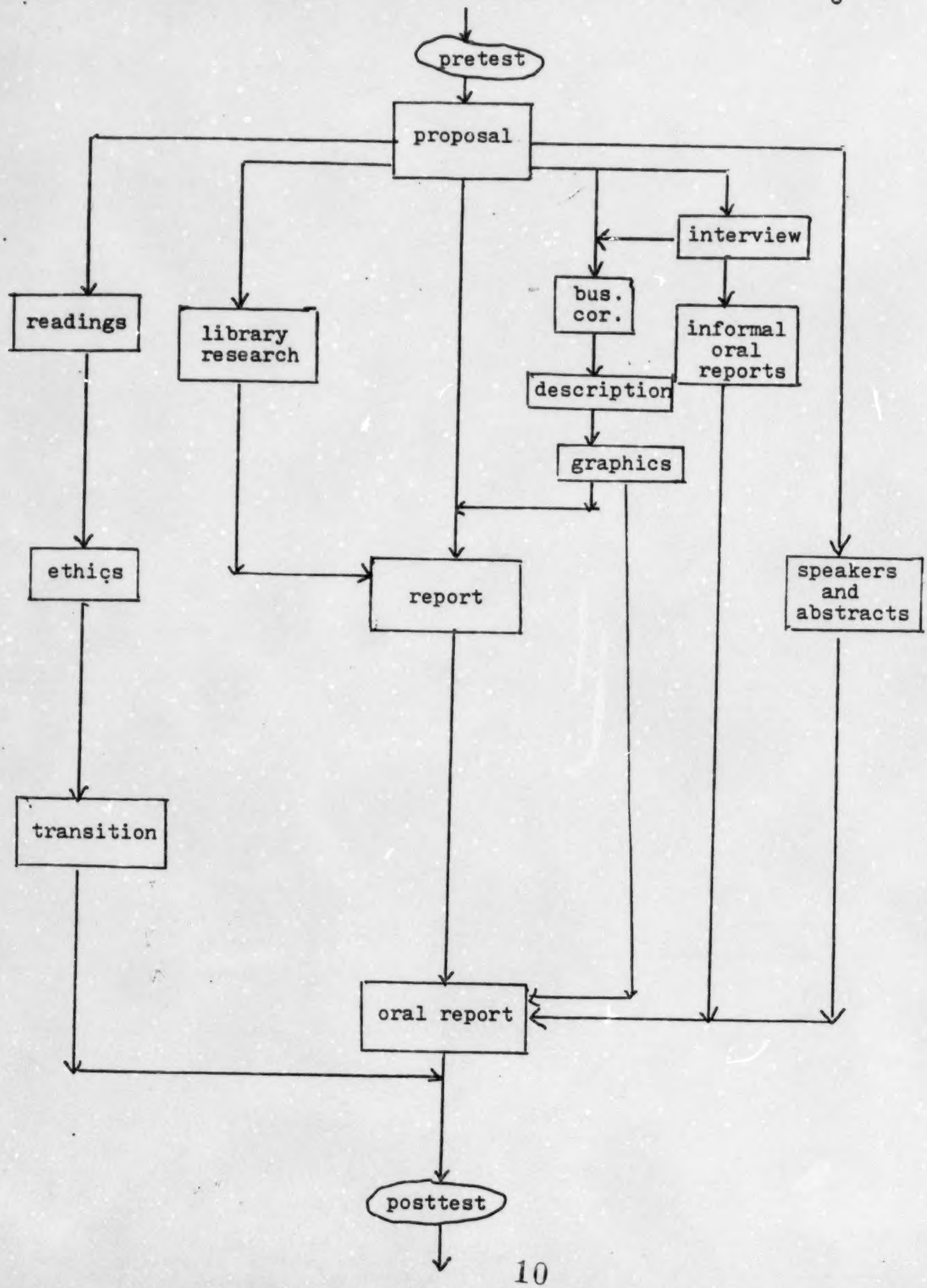

Figure 2: Branching of Course Activities

The instructors have ultimate control of the number of assignments given. Sometimes, students take longer than expected completing a particular assignment; sometimes they do the work very quickly. We must note, however, that it is not unreasonable to expect students to complete a minimum of 25 assignments (approximately 60 pages total of writing), including a proposal of at least 5 pages and a report not less than 10 pages long. Communication, after all, is best learned by communicating. Several assignments serve dual purposes; for example, students learn how to write memos by submitting progress reports in memo form. These can then be used as a kind of rough draft for the final report. In addition, all assignments do not require comprehensive grading. After the first two submissions, abstracts can be graded with a simple ✓, ✓+, ✓- technique.

In-class and out-of-class activities are usually intended to simulate actual engineering experiences. Consequently, lecturing is minimized; collaborative learning activities encouraging a problem-solving approach to in-class activities are emphasized. Peer evaluation is encouraged. We hope that the instructors will choose to set up culmulative grading procedures and that students will have opportunities to help establish evaluative criteria and, if possible, in developing a class stylesheet. The instructors should aid students in understanding the why, as well as the what, of effective communication.

DISCUSSION OF SELECTED FEATURES OF COURSE CONTENT

Each assignment includes a procedure, a series of steps which the student follows in completing an exercise. The procedures for the written assignments are based on current research in the composing process and conventions of classical rhetoric. Each writing assignment includes the following steps:

1. Identifying the subject or problem,
2. Generating information,
3. Developing a controlling idea,
4. Analyzing the information,
5. Categorizing the information,
6. Sequencing the information,
7. Analyzing the audience,
8. Using appropriate format,
9. Proofreading.

These are not necessarily sequential. Audience analysis, for example, impacts every step in the process and is a crucial lesson in improving student writing. Simulation of actual engineering situations, therefore, also creates simulation of "real life" audiences and ensures that students work with the concept of audience adaptation.

Other features of the course content include the following:

1. Pretest/posttest. We suggest that the pretest and posttest be identical to allow for a direct comparison and demonstration of improvement. This test should present a "real life" but limited problem which the student can propose a solution in the given time period. The situation should also suggest an appropriate audience.

2. Proposal. Since the proposal is frquently the first step to initiate a project in the engineering profession, it logically serves as the first assignment in the course. Although

the proposal acts as a miniversion of the report, students are not expected to meet the same standards as will be required later in the semester. Assigning the proposal early in the semester creates a learning experience in which students are immediately introduced to the full range of professional and rhetorical aspects of the course.

The proposed problem area, usually related to the college campus, should not demand an expertise beyond that of the average freshman. Some suggested general topics include

a. Local traffic and parking
b. Transportation
c. Study areas
d. Classroom utilization
e. Energy
f. Food services
g. Handicapped student services and access
h. Grounds maintenance and security
i. Campus offices
j. Computers
k. Housing
l. Communication systems
m. Study aids
n. Job related problems.

The proposal acts as a bid for the final report topic. If it is accepted by both the engineering and the rhetoric instructors, the student is awarded his choice of topic. Even at this point, students ahould be considered consulting engineers, and, if possible, a representative of the college should take them on a formal tour of the campus, highlighting problem areas.

3. Report. The formal report acts as the focus of the course. Most of the assignments serve to develop skills required for writing the report.

4. Oral communication. Increasingly, engineers are recognizing the need for adequately developed oral communication skills. (See attached report from a recent issue of Engineering

Education.) Consequently, students should be required to interview an engineer on his or her job site and to present both a written and informal oral report. Other informal oral reports should be incorporated whenever possible.

At the end of the semester, students present a 20 minute formal report based on their investigation. Ideally, these talks will be videotaped either in the college's TV studio or in the classroom. Instructor and self-evaluation of the presentation is particularly effective if it occurs when the videotape is played back for the student during a private conference.

5. Speakers/abstracts. Speakers from various positions in industry and education add an exciting dimension to this course. Generally, the instructors will not have a difficult task in recruiting volunteers. In addition, we have prepared several videotapes of interviews with different speakers, including a fine arts professor who had dropped out of an engineering curriculum (at R.P.I.!) and a Chicago law school professor who specializes in product liability.

Requiring the students to write abstracts of each presentation insures three effects:

a. Students learn to listen more effectively;
b. Students learn how to organize information into effective paragraphs;
c. Students learn how to write an informational abstract, one of the more difficult tasks in writing for engineers.

6. Ethics. Discussion of issues in engineering ethics, while not essential at the freshman level, provides an opportunity for the student to explore his or her own values. In doing so, students are further exposed to the "real life" expectations society has of the engineer. In addition, these issues are related to many of the topics considered in traditional composition courses and may serve as topics for assignments in persuasive writing.

7. Vocabulary. The course offers very little time to work on vocabulary skills. Students, however, are quite adept at increasing their vocabulary, using a variety of techniques, if they are so motivated. We have developed a computerized vocabulary test based on a word list given to the students at the beginning of the semester. The students may take the test whenever they wish; they make take it up to five times and must pass at least one with a score of 80% or better in order to pass the course. Few students have difficulty eventually meeting this goal.

Tentative Syllabus

Freshman Composition and Introduction
to Engineering

Instructors:
Offices:
Office Hours:
Office Telephone:
Home Telephone:

Texts: Procedures by L. Brillhart and M.B.Debs (Triton College, 1980). *Note: This is not vanity; this is the only collection of materials I know of aimed specifically for freshman engineering students.*

and/or selections from various textbooks in rhetoric and technical writing.

Access to a standard college dictionary and a thesaurus.

Readings: Books - choose one or two -
Wizard of Earthsea, Ursula LeQuin
Never Cry Wolf, F. Mowat
Player Piano, K. Vonnegut
Zen and the Art of Motorcycle Maintenance, R. Pirsig
Lives of a Cell, L. Thomas

Articles - suggested -
"Problem Solving," "Visual Image," "Acquisition of Language," "Eyewitness Testimony," from Scientific American.
"Making a Safe Matchbook," "Consumer Safety and The Botched Trouble Light Recall," from New Engineer.
"How I Designed an A-Bomb My Junior Year at Princeton," from Esquire.

Course Requirements:

1. Each student will be expected to successfully apply the following steps to any writing situation -
   - generating and/or discovering information;
   - selecting a workable thesis or organizing idea for a set of information;
   - focusing the material by accommodating the reader's frame of references;
   - developing the paragraph effectively by relating pieces of information;
   - developing the essay effectively;
   - effectively using the tools of writing, i.e., handbook, dictionary, style sheet.
2. Class attendance.
3. Participation in group discussion and small group activities.

4. At least two conferences with instructor.
5. Completion of all written, oral and reading assignments.
6. Successful completion of the learning contract which will be developed to specify areas of improvement.
7. A score of 80% or better (within five tries) on the computerized vocabulary test.
8. Additional work in the writing lab, if required.

Assignments:

Due		Suggested Points
Sept. 18	Proposal worksheets	50
Sept. 25	Interview -written report	20
Sept. 25	Thank you letter	10
October 2	Proposal	100
October 9	Description of an Object	10/10
October 16	Description of a Mechanism	10/10
October 23	Description of a Process	20/20
October 28	Memo - progress report (intro)	10
November 2	Memo - progress report (history)	10
November 4	Memo - progress report (procedures)	10
November 11	Memo - progress report (results)	10
November 13	Instructions	20/20
November 13	Letter of transmittal	20
November 18	Memo - progress report (conclusions)	10
November 18	Report worksheets	50
November 25	Final report	200
Dec. 2,4,9,11	Oral reports	100
Next class	Abstracts (8)	10 each
	Quizzes	20
	Class participation and attendance	80

	Total	900 pts.

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